AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (previously presented) A method for computer aided processing of dual or multiple energy images acquired using an X-ray source, the method comprising:

employing a data source, the data source including a dual or multiple energy image set including a high energy image, a low energy image, a bone image, and a soft tissue image, each member of the image set being available for processing along with each other member of the image set, each member of the image set being arranged at the data source in such a manner as to allow the computer aided processing to be performed once, as opposed to parallel operations, by incorporating features from all images of the image set;

defining a region of interest within an image from the dual or multiple energy image set;

employing a feature extraction algorithm and extracting feature measures from the region of interest;

employing a feature selection algorithm on the region of interest to sort through candidate features of the region of interest, classifying a candidate region of interest on each image, and subsequently combining results of all of the computer aided processing operations; and

reporting at least one of the feature measures on the region of interest.

2. (original) The method of claim 1 further comprising acquiring the image set using projection X-ray radiographic imaging.

3. (previously presented) The method of claim 1 further comprising acquiring the image set using x-ray computed tomography (CT), wherein the dual or multiple energy CT acquisition enables computer aided discrimination between different tissue types of differing densities from different regions of an imaged object.

4. (original) The method of claim 1 further comprising acquiring the image set using digital x-ray tomosynthesis.

5. (canceled)

6. (previously presented) The method of claim 1 further comprising incorporating prior knowledge from training for classifying the region of interest.

7. (original) The method of claim 6 wherein incorporating prior knowledge from training includes computing features on known samples of different normal and pathological medical conditions.

8. (original) The method of claim 7 wherein the feature selection algorithm sorts through features of the known samples, selects useful features of the known samples, and discards features of the known samples which do not provide useful information.

9. (original) The method of claim 7 wherein different classification groups are identified for sorting the feature measures, and further wherein the feature selection algorithm comprises determining a feature measure's ability to classify the region of interest into a classification group.

10. (original) The method of claim 9 wherein the feature selection algorithm further comprises ranking each feature measure based on each feature measure's ability to

classify the region of interest into a classification group.

11. (original) The method of claim 10 wherein the feature selection algorithm further comprises reducing quantity of feature measures by eliminating correlated features.

12. (original) The method of claim 10 wherein the feature selection algorithm further comprises selecting a highest ranked feature measure and adding additional feature measures in descending order.

13. (previously presented) The method of claim 1 wherein classifying the region of interest comprises classifying one or more medical conditions.

14. (previously presented) The method of claim 1 wherein the data source further includes at least one of image acquisition system information and demographic information, symptoms, and history of patient, wherein the image acquisition system information, demographic information, symptoms, and history of patient serve as feature measures in the feature selection algorithm.

15. (original) The method of claim 1 further comprising detecting and diagnosing at least one medical condition.

16. (original) The method of claim 1 wherein defining a region of interest comprises manually selecting a region of interest.

17. (original) The method of claim 1 wherein defining a region of interest comprises utilizing an automated algorithm.

18. (original) The method of claim 17 wherein utilizing an automated algorithm includes inputting user specifications.

19. (original) The method of claim 1 comprising defining regions of interest and incorporating features from all regions of interest on all images.

20. (canceled)

21. (original) The method of claim 1 wherein reporting at least one of the feature measures comprises using a marker on a display of each image within the dual or multiple energy image set where the at least one feature measure is located.

22. (original) The method of claim 21 further comprising displaying a single image which incorporates all markers from each image within the dual or multiple energy image set.

23-33. (canceled)

34. (previously presented) A method for detecting bone fractures, erosions, calcifications or metastases using an X-ray source, the method comprising:

employing a data source, the data source including a dual or multiple energy image set, the image set comprising a high energy image, a low energy image, a bone image, and a soft tissue image, each member of the image set being available for processing along with each other member of the image set, each member of the image set being arranged at the data source in such a manner as to allow processing of the image set to be performed once by incorporating features from all images of the image set;

utilizing a bone image from a dual or multiple energy image set;

selecting a region of interest within the bone image to search for a calcification, fracture or metastatic bone lesion;

segmenting bone from a background of the bone image;

identifying a candidate region within the bone as a candidate for a calcification, fracture, erosion, or metastatic bone lesion; and

classifying an identified candidate region using a computer aided rule based approach, wherein different rules apply for calcifications, metastases, erosions, and fractures, and for different types of fractures and different properties of metastases.

35-36. (canceled)

37. (previously presented) The method of claim 34 wherein rules are based on size measurements of line edges of the identified candidate region.

38. (original) The method of claim 34 wherein segmenting bone comprises utilizing a region growing algorithm.

39. (original) The method of claim 38 wherein the region growing algorithm is manually initialized by having a user select a seed point.

40. (original) The method of claim 38 wherein the region growing algorithm is automatically initialized by utilizing bone attributes to select a seed point.

41. (original) The method of claim 34 wherein segmenting bone comprises multi-level intensity thresholding.

42. (original) The method of claim 34 wherein identifying a candidate region comprises utilizing an edge detection algorithm.

43. (original) The method of claim 42 wherein image processing using morphological erosion is used for eliminating noise and false edges.

44. (original) The method of claim 42 wherein rib edges are eliminated using a connectivity algorithm.

45. (original) The method of claim 34 further comprising indicating the candidate region on a display.

46. (original) The method of claim 45 wherein indicating the candidate region comprises placing a marker on the bone image indicative of a classification of the candidate region.

47. (previously presented) A method for detecting lung disease using an X-ray source, the method comprising:

employing a data source, the data source including a dual or multiple energy image set, the image set comprising a high energy image, a low energy image, a bone image, and a soft tissue image, each member of the image set being available for processing along with each other member of the image set, each member of the image set being arranged at the data source in such a manner as to allow processing of the image set to be performed once by incorporating features from all images of the image set;

utilizing a soft-tissue image from a dual or multiple energy image set;

selecting a region of interest within the soft-tissue image to search for an indication of disease;

segmenting the region of interest from a background of the soft-tissue image;

identifying a candidate region within a bone image which correlates to the region of interest in the soft-tissue image;

extracting features from the candidate region in the bone image; and,

classifying the region of interest in the soft-tissue image as a candidate for soft-tissue disease utilizing the features extracted from the bone image, the classifying comprising using a computer aided rule based approach, wherein different rules apply for

different medical conditions, and different rules are used for the soft-tissue and bone-images.

48. (original) The method of claim 47, further comprising identifying a solitary pulmonary nodule or lesion, and wherein if the features extracted from the bone-image are indicative of calcification of the nodule, then the method further comprising utilizing the bone-image calcification features to classify the region of interest in the soft-tissue image as indicatively benign.

49. (canceled)

50. (original) The method of claim 47 further comprising reporting at least one of the features using a marker on a display of each image within the dual or multiple energy image set where the at least one feature is located and displaying a single image which incorporates all markers from each image within the dual or multiple energy image set.

51. (original) The method of claim 50 further comprising displaying a single image which incorporates markers uniquely indicative of results from the soft-tissue image that have been further classified based on results from the bone-image.

52-57. (canceled)

58. (previously presented) The method of claim 3, wherein acquiring the image set comprises acquiring an image set of volumetric computed tomography images using cone-beam tomography.

59. (previously presented) The method of claim 1, wherein the feature selection algorithm comprises:

reducing a quantity of feature measures by eliminating correlated features, thereby eliminating extra features that provide the same information as other features, resulting in a reduced set of feature measures; and

using the reduced set of feature measures, selecting a highest ranked feature measure, and adding additional feature measures, based on a descending ranking, until the adding of the additional feature measures no longer provides additional useful information.

60. (previously presented) The method of claim 1, wherein the feature selection algorithm sorts through candidate features, selects useful ones of the candidate features, and removes those that provide no information or redundant information.

61. (previously presented) The method of claim 1, wherein:

the reporting comprises reporting the high energy image, low energy image, or both, with structures from the bone image, soft tissue image, or both, removed.